

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### An Acoustic Warning Device for Attachment to the Valve of a Pneumatic Tyre to Indicate Loss of Pressure

I, ANGELO RICCHINI, of Italian Nationality, of Via G. Teosa 10, Brescia, Italy, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a device adapted for attachment to the valve of a pneumatic tyre and adapted to give an audible indication of loss of pressure within the tyre.

According to the present invention there is provided a device adapted for attachment to the valve of a pneumatic tyre and adapted to give an audible indication of loss of air pressure within the tyre, comprising an outer casing within which are mounted a cylinder, a first piston mounted within said cylinder and adapted for movement therein, a second piston one end of which is attached to the lower end of the cylinder and the other end of which mates with a base cap attached to the tyre valve engaging end of the casing, a first spring acting on said first piston to urge same towards said second piston, a second spring acting on said cylinder to urge same towards said base cap, ports and seals being provided to permit, when the device is attached to a tyre valve, air from the tyre valve to pass into the space defined by the inside of the cylinder and the opposing faces of the pistons and also to pass from the tyre valve into the space defined by the inside of the casing and the outside of the cylinder, an outlet port being provided through said casing and adapted to be brought into air communication with the said space defined by the inside of the casing and the outside of said cylinder when the first piston is urged towards said second piston by said first spring, and a diaphragm mounted on said casing and over said outlet port and adapted to vibrate, under the action of air passing out through the outlet port, to

give an audible indication of loss of air pressure within the tyre.

Preferably a passage is provided through said first piston to permit the expulsion of air trapped within the upper part of the cylinder, in the space defined by the inside of the cylinder and the head of the piston, when the piston is moved against the action of the first spring, as would be the case during attachment of the device to a tyre valve.

An embodiment of the present invention will now be described merely by way of example with reference to the accompanying drawing which has a diagrammatic elevation in vertical section of a device according to the present invention.

Referring to the drawing, the device consists of an outer casing in the form of a tubular body 1 within which are mounted the following component parts: a small hollow cylinder 2 having upper and lower chambers 3 and 4 respectively and having transverse ports 5 providing air communication with the inner chamber of the tubular body 1, an annular washer 6 also being provided; a first piston 7 adapted to move within the said upper and lower chambers 3, 4 of the cylinder 2, upper, intermediate and lower annular seals 8, 9, 10 being provided to effect sealing between the piston 7 and the walls of the chambers 3, 4, the piston having a passage or vent 11 therethrough to provide an air passage between the lower chamber 4 and the upper part of the tubular body when the piston penetrates into the lower chamber 4 sufficiently for the vent 11 to open into said lower chamber; a second piston 12 one end of which is attached to the cylinder 2 by being screwed into the lower end of the cylinder 2, and provided with two annular seals 13, 14 and having an axial port 16 and upper and lower transverse ports 17 and 18; a tubular base cap 19 attached to the body

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1 by being screwed into the tyre valve engaging end of the body 1, the other end of the second piston 12 mating with said base cap 19 and being sealed therewith by the action of the seals 13 and 14 which define therebetween an annular chamber 15, the cap 19 having one or more transverse ports 20 communicating with its interior; a first expansion spring 23 acting through a plunger 24 on the piston 7; a second expansion spring 22 acting on the hollow cylinder 2 and housed in the chamber 21 of the tubular body 1; an elastic cylindrical membrane or diaphragm 25 mounted around the outside of the upper part of the tubular body 1; a hollow cylinder 26, with a slot 27, concentrically mounted around the diaphragm 25 in such manner that the said slot 27 is in line with a transverse outlet port 28 formed through the upper part of the tubular body 1; and a plug 29 screwed on the tubular body 1 to hold in position the first expansion spring 23, the elastic diaphragm 25 and the plunger 24.

The lower end of the above-described device can be attached to a valve V of a pneumatic tyre by being screwed by means of the base cap 19 on to the valve V in such manner that the second piston 12 and the cylinder 2 are moved upwards against the action of the second expansion spring 22 until the ports 17 and 20 of the piston 12 and the cap 19 are brought into line. The piston 12 acts on the head of the plunger S of the valve V and causes the opening of the valve and thereupon the passage of air through the ports 18, 16, 17 and 20 and into the space defined by the inside of the casing or body 1 and the outside of the cylinder 2 and also into the space defined by the inside of the cylinder 2 and the opposing faces of the pistons 7, 12. The air which passes through the port 16 acts on the head of the piston 7 which moves upwards against the action of the spring 23 in such manner as to cause the upper seal 8 to seat against the lower end of the chamber 3 in the cylinder 2, thus blocking the passage of air through the ports 5 from the chamber 21 of the tubular body 1 to the chamber 3 of the cylinder 2.

When the pressure in the air chamber of the tyre begins to fall, the pressure acting on the piston 7 decreases and this piston moves downwards under the action of the first expansion spring 23, as a result of which the seal 8 moves downwards also away from the base of the chamber 3. At this point, the air passing from the valve V to the chamber 21 now passes through the ports 5 in the cylinder 2 and discharges into the chamber of the upper part of the tubular body 1 and passes through the port 28 and applies pressure against the elastic diaphragm 25 which,

because of the slot 27 in the cylinder 26, vibrates powerfully and emits an audible whistling sound, which serves as an acoustic indication of the loss of pressure in the tyre.

The provision of the passage or vent 11 in the first piston 7 permits the expulsion of air trapped within the chamber 4, which is the upper part of the cylinder 2, in the space defined by the inside of the cylinder and the head of the piston 7, when the piston is moved against the action of the first spring 23 by the pressure of air from the tyre valve, as would be the case during attachment of the device to a tyre valve. If such a vent was not provided, the air trapped in the chamber 4 would impede the upward movement of the piston 7 in the cylinder.

#### WHAT I CLAIM IS:—

1. A device adapted for attachment to the valve of a pneumatic tyre and adapted to give an audible indication of loss of air pressure within the tyre, comprising an outer casing within which are mounted a cylinder, a first piston mounted within said cylinder and adapted for movement therein, a second piston one end of which is attached to the lower end of the cylinder and the other end of which mates with a base cap attached to the tyre valve engaging end of the casing, a first spring acting on said first piston to urge same towards said second piston, a second spring acting on said cylinder to urge same towards said base cap, ports and seals being provided to permit, when the device is attached to a tyre valve, air from the tyre valve to pass into the space defined by the inside of the cylinder and the opposing faces of the pistons and also to pass from the tyre valve into the space defined by the inside of the casing and the outside of the cylinder, an outlet port being provided through said casing and adapted to be brought into air communication with the said space defined by the inside of the casing and the outside of said cylinder when the first piston is urged towards said second piston by said first spring, and a diaphragm mounted on said casing and over said outlet port and adapted to vibrate, under the action of air passing out through the outlet port, to give an audible indication of loss of air pressure within the tyre.

2. A device as claimed in Claim 1, in which a passage is provided through said first piston to permit the expulsion of air trapped within the upper part of the cylinder, in the space defined by the inside of the cylinder and the head of the piston, when the piston is moved against the action of the first spring, as would be the case during attachment of the device to a tyre valve.

3. A device adapted for attachment to the valve of a pneumatic tyre and adapted to give

an audible indication of loss of air pressure within the tyre substantially as hereinbefore described with reference to the accompanying drawing.

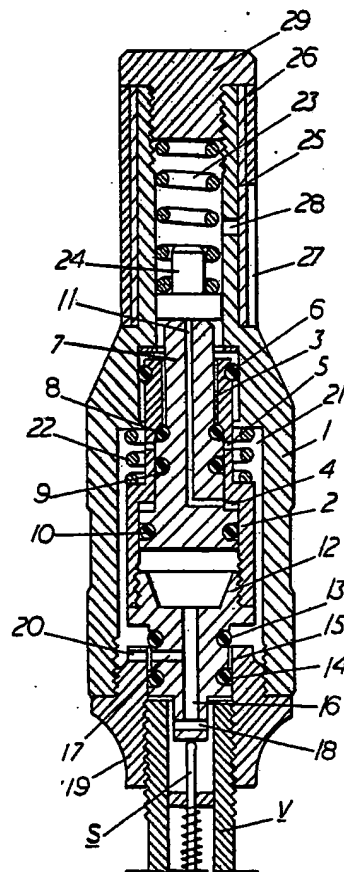
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